UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/533,778	03/24/2000	Akira Teraoka	2000 0311A	2449

7590 01/07/2004

Wenderoth Lind & Ponack LLP
2033 K Street NW
Suite 800
Washington, DC 20006

EXAMINER	
SONG, HOON K	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 01/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/533,778	TERAOKA, AKIRA	
	Examin r	Art Unit	
	Hoon Song	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 23 and 27, the limiting meaning of "out of vertical" is unclear.

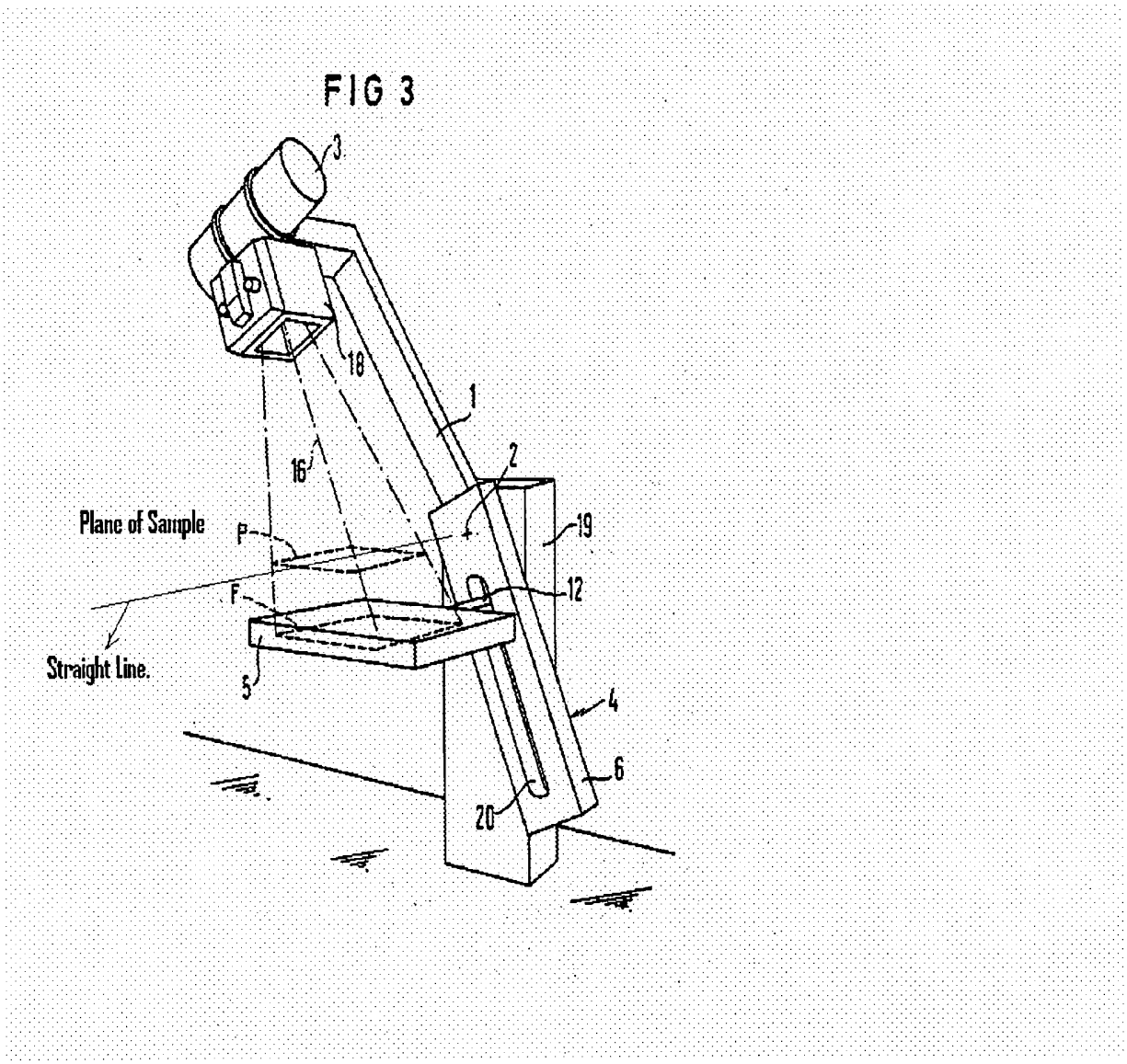
For examination purposes, the phrase has been taken to mean "not vertical".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Warden (US 4455668).



Regarding claim 25, Warden teaches an X-ray inspection apparatus, comprising:

an X-ray source (3);

An X-ray detecting device operable (F) to detect X-rays, wherein said X-ray detecting device and said X-ray source are positioned relative to each other so that a sample can be placed there between and so that X-rays emitted from said source to pass through a sample can be detected by said X-ray detecting device, said X-ray

detecting device having an X-ray incidence plane arranged to be parallel to a straight line (see a drawing above);

A swinging means for swinging said X-ray detecting device in translational motion about the straight line as an axis while said X-ray incidence plane is maintained facing in the same direction (figure 1); and

A rotating means (1) for rotating said X-ray source about the straight line as an axis of rotation in synchronization with said X-ray detecting device (figure 1).

Regarding claim 30, Warden teaches a sliding mechanism (20) for sliding said X-ray detecting device in a direction perpendicular to said X-ray incidence plane (figure 3).

Claims 33-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakajima (US 4853540).

Regarding claim 33, Nakajima teaches an x-ray inspection comprising:

An x-ray source (10);

A plurality of x-ray detecting devices (F1-F3) operable to detect x-rays wherein said x-ray detecting devices and said x-ray source are positioned relative to teach other so that a sample can be placed there between and so that x-rays emitted from said source to pass thought a sample can be detected by said x-ray detecting devices each of said x-ray detecting devices having an x-ray incidence plane; and

A rotating means for rotating said x-ray source about a straight line as an axis of rotation (figure 4a);

Wherein said x-ray detecting devices are positioned so as to be able to form a uniform geometric relationship with said x-ray source on the basis of a plane that

includes the straight line located at a sample position between said x-ray detecting devices and the x-ray source (figure 4a).

Regarding claim 34, Nakajima teaches that said x-ray detecting devices are positioned along an arc which has the straight line extending through the center thereof. (figure 4a).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warden (US 4455668) in view of Mustain (US 4829547).

Regarding claim 21, Warden teaches a method of x-ray inspection of a section of a sample comprising:

Arranging an X-ray source (3) and an X-ray detecting device (F) so as to face each other with the sample (P) between them (figure 1);

Swinging the X-ray detecting device (F) in translational motion about a straight line as an axis (see a drawing above), the straight line lying in a plane of the section of the sample, while maintaining an incidence plane of the X-ray detecting device parallel to the section of the sample (figure 1);

Applying X-rays to the sample with the X-ray source about the straight line in synchronization with said swinging of the X-ray detecting device (figure 1); and

Detecting X-rays passing through the sample with the X-ray detecting device (figure 1).

However Warden fails to teach the x-rays are applied while rotating the X-ray source.

Mustain teaches an x-ray source irradiating x-rays during rotating the x-ray source about an object (column 3 line 55+).

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to irradiate x-rays during x-ray is rotated about an object as taught by Mustain with the x-ray tomographic system of Waren since the x-rays during rotating of x-ray source would provide more information to generate an topographic image. Thus one would be motivated to generate x-rays while rotating the x-ray source in order to generate better tomographic images.

Regarding claim 23, Warden teaches that the section of the sample is not vertical to the stage (horizontal).

Claims 26-29 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warden in view of Armistead (US 4852131).

Regarding claim 26, Warden teaches that a stage is located between said X-ray detecting device and said X-ray source for having the sample placed thereon.

However Warden fails to teach that a subject section of the sample is in a plane containing the straight line and parallel to said X-ray incidence plane; and the section is vertical to said stage.

Armistead teaches an x-ray and detector which is arranged horizontal to a plane of a sample holder (figure 4).

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to change a direction of irradiation source and detector such that the direction of the x-ray beam is horizontal to a plane of an object stage (figure 4) while a section plane of the object is vertical to the plane of the object stage (figure 4). This arrangement would allow one to image different views of the object.

Regarding claim 27, Warden as modified by Armistead would teach a subject section of the sample is in a plane containing the straight line and parallel to said x-ray incidence plane as motivated provided above.

Regarding claims 28 and 29, Warden as modified by Armistead would teach the straight line is vertical to said stage as motivation provided above.

Regarding claims 31-32,Warden fails to teach a stage transfer device.

Armistead teaches a stage transfer device for two dimensionally transferring a stage on which the sample is placed (figure 4).

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adapt Armistead's transfer stage in order to take x-ray image of an sample from different locations. Thus, it would provide more accurate inspection of the sample.

Claims 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warden as modified by Mustain as applied to claim 21 above, and further in view of Armistead (US 4852131).

Regarding claim 22 and 24, Warden as modified by Mustain fails to teach the section of the sample is vertical to the stage and vertical to the straight line.

Armistead teaches an x-ray and detector which is arranged horizontal to a plane of a sample holder (figure 4).

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to change a direction of irradiation source with detector such that a direction of the x-ray beam is horizontal to a plane of an object stage (figure 4) while a section plane of the object is vertical to the plane of the object stage (figure 4). Thus, this arrangement would able to taking an image of hidden part of an object (column 2 line 35+).

Response to Arguments

Applicant's arguments with respect to claims 21-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 703-308-4858. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hoon Song HKS

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER